NY Composting Groundwater Mn and Fe case-2012-13

From: **stu** [stubuckner@optonline.net]
Sent: Monday, **February 06, 2012** 2:51 PM

To: Chaney, Rufus

Subject: Mn in yw compost

Hi Rufus,

Hope all is well with you.

What are typical levels of Manganese in yard trimmings compost?

What are high levels of Mn in yard trimmings compost and what problem might that pose, if any.

The research I have read and the data I've collected show no impact of yard trimmings compost on groundwater. Do you know of any research that shows otherwise?

Is there any reason to require monitoring of groundwater at yard waste composting

Thanks,
Stu

Which email address should I use?

_____

Dr. Stuart Buckner
Buckner Environmental Associates (BEA)
8 Cardinal Lane
East Islip, NY 11730
631.834.1400
stubuckner@optonline.net
Consultants in:
Composting, Organics Recycling, Anaerobic Digestion, Bioplastics, Organics Management and Integrated Solid Waste Management Solutions
Conference & Exhibition Planning and Management
Not-for-Profit Association Governance and Management
Fundraising – Campaigns for Sponsors, Donors, Members

From: **Chaney, Rufus**
Sent: Monday, **February 06, 2012** 3:09 PM

To: 'stu'

Subject: RE: Mn in yw compost

Stu:

One needs to understand how Mn is deficient or toxic in order to understand how much is enough or too much in compost. At pH 5.4 and above, microbes oxidize nearly all Mn to MnO_2, an insoluble form which is available to roots, but not water soluble. At lower pH, especially if the soil is air dried (chemical reduction occurs between OM and MnO_2 to generate Mn^{2+}), and if the total Mn is high, the compost or soil can become Mn phytotoxic. In the past, bark composts from AR contained phytotoxic Mn because of the pH and because the bark of some trees can be very high in Mn when the soil is high in Mn and the soil pH is low. Hardwood bark was the culprit in the AR case. There are papers in the horticultural literature from when people were trying to sell bark as a soilless medium for potting media. Wood is generally not likely to cause Mn phytotoxicity under any case I have read about.

Most composts are pH 6.5-7, and Mn is in non-toxic forms at all Mn concentrations. But still in plant available forms that roots can absorb by reducing MnO_2 or absorbing Mn^{2+} bound to OM and clays.

Yard debris is usually 35-200 ppm total Mn. It could reach 1000 ppm without much concern unless the compost is very strongly acidic.

I have not read of impacts of yard debris compost on ground water, but you have to keep in mind poor composting under highly leaching conditions. Recall that until all the OM is fully stabilized, if a compost is taken to anaerobic conditions by poorly drained condition during composting or storage, low molecular weight organic materials (organic acids, fulvic materials) formed under anaerobic conditions can become phytotoxic to sensitive seedlings and even kill seedlings (we killed pepper and Impatiens seedlings with "stored to wet biosolids compost". Much like what happens when you mix a lot of raw OM into soil until it become more stabilized. Some people stress the acetic acid formed under those conditions being toxic, other stress other organic compounds. So I support doing even yard debris composting on prepared pads with management of runoff water. One can surely find some molecules leaching, although not likely at levels which would justify concern about groundwater contamination.

If runoff and leaching are limited, I see no reason to require monitoring of yard-debris composting sites.

From: **Rodney Tyler** [rodt@filtrexx.com]
Sent: Wednesday, **October 02, 2013** 8:40 AM

To: Chaney, Rufus

Subject: FW: Manganese Issue near Long Island . . .

Can you help with this? are you working?

:)

Gotta love washington

R. Wade Tyler
CEO
Corporate Address:
35481 Grafton Eastern Rd.
Grafton, OH 44044
440-926-2607
www.filtrexx.com
440-926-4021 (fax)

From: Lori Scozzafava [mailto:lscozzafava@compostingcouncil.org]
Sent: Tuesday, October 01, 2013 4:55 PM

To: alexassoc@earthlink.net; 'Brian Fleury'; 'carrie gregory'; 'Chuck Wilson'; 'Eliot Epstein'; 'FRFR (Frank Franciosi)'; 'Heidi Ringhofer'; 'Jeff Ziegenbein'; 'Lorrie Loder'; lorrieloder116@gmail.com; 'Matt Cotton'; 'Mike Manna'; 'Patrick Geraty'; 'Paul Sellew'; Rodney Tyler; slb@u.washington.edu; waynesr@erthproducts.com

Subject: Manganese Issue near Long Island . . .

I don't enjoy sending negative news clips, but we all need to know when the press is nipping at our heels.

If any of you have knowledge about what is happening here and can give me some info in case the press calls, I'd appreciate it.

http://www.newsday.com/long-island/water/potential-groundwater-threat-seen-from-composting-1.6147625?print=true

Lori
Lori Scozzafava

From: **Chaney, Rufus**
Sent: Wednesday, **October 02, 2013** 10:22 AM

To: 'Rodney Tyler'

Subject: RE: Manganese Issue near Long Island . . .

Rod:

I advised the NY DEC about these cases of Mn and Fe leaching. If high BOD materials are mixed with soil and leaching occurs, Mn and Fe are reduced and leach. Apparently improper management, and lack of a hard pad for the composting caused multiple locations to have this problem.

No, I'm not working. Came in to get some stuff from my office. Sad day.

Rufus

From: **Chaney, Rufus**
Sent: Thursday, **October 03, 2013** 3:21 PM

To: 'Greg Evanylo'; Cary Oshins
Cc: Richard Stehouwer; Stu Buckner

Subject: RE: Composting as a source of manganese in groundwater

Attachments:
Long Island Compost-2013-Horseblock Road Investigation Report - July 2013.pdf;
Long Island Compost-7-2013-Newsday Article.pdf

Greg et al.:

I was contacted by Stu Buckner who shared the groundwater monitoring data from the local government which clearly shows violation of Mn and Fe limits. Mixing biodegradable OM into surface soils causes reduction and release of soluble Fe and Mn species which in acidic sandy soils can leach a long distance. Some of the sites were “on farm” sites to increase capacity with no prepared pad at all. Others were apparently ill-prepared pads and mis-management. It is a simply story, and unavoidable without a pad which restricts leaching, and prevents reaction of BOD with soil oxides.

Sad, but predictable. NY will change site regulations in response to this I suspect.

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Best,

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*From: stu [**stubuckner**@optonline.net]*
*Sent: Monday, **February 06, 2012** 2:51 PM*

To: Chaney, Rufus

Subject: Mn in yw compost

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From: *Greg Evanylo [mailto:gevanylo@vt.edu]*
Sent: *Wednesday, October 02, 2013 9:46 PM*

To: *Cary Oshins*
Cc: *Richard Stehouwer; Stu Buckner; Chaney, Rufus*

Subject: Re: Composting as a source of manganese in groundwater

It's hard to make sense of the article. I'm skeptical of the connection between yard trimmings compost and Mn contamination of groundwater. The only facility well-described in the article ("Much of the 62-acre facility will be enclosed and a process known as an anaerobic digester will turn clippings into compost in an air-locked environment. The methane gas created will be converted into compressed natural gas to fuel equipment and the company's fleet of 10 trucks.") is anaerobic digestion, not composting.

In order to contaminate groundwater, there needs to be a source of Mn, which is not typically high in yard trimmings; however, the soil can contain much Mn. Secondly, the Mn must be solubilized in order to transport it. Under aerobic conditions prevalent in soils, Mn will be present as Mn oxide which is not soluble. Organic matter can lower redox conditions (i.e., supply electrons), solubilize Mn, and increase its mobility. The article does not provide enough information to explain how composting on a permeable surface may have resulted in a considerable increase in aquifer Mn concs.

greg

On Thu, Oct 3, 2013 at 12:26 AM, Cary Oshins <cary.oshins@compostingcouncil.org> wrote:

Have you seen this? I'd be interested in any theories on how composting could be the cause of elevated manganese.

Thanks,

Cary
USCC

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Greg Evanylo

From: **Greg Evanylo** [gevanylo@vt.edu]
Sent: Friday, **October 04, 2013** 2:01 PM

To: Chaney, Rufus; cary.oshins@compostingcouncil.org
Cc: rcs15@psu.edu; stubuckner.scb@gmail.com

Subject: RE: Composting as a source of manganese in groundwater

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*At 03:21 PM **10/3/2013**, **Chaney, Rufus** wrote:*

Greg et al.:

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*From: stu [**stubuckner**@optonline.net]*
*Sent: Monday, **February 06, 2012** 2:51 PM*

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To: Cary Oshins
Cc: Richard Stehouwer; Stu Buckner; Chaney, Rufus

Subject: Re: Composting as a source of manganese in groundwater

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Cary
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Greg Evanylo
Professor and Extension Specialist; Crop and Soil Environmental Sciences
185 Ag Quad Lane; 426 Smyth Hall, Virginia Tech; Blacksburg, VA 24061
Ph: 540-231-9739; Fax: 540-231-3075; Cell: 540-257-4647
gevanylo@vt.edu; @VTCompost ; http://www.cses.vt.edu/people/tenure/evanylo.html

---

From: **Chaney, Rufus**
Sent: Friday, **October 04, 2013** 2:03 PM

To: 'Greg Evanylo'; cary.oshins@compostingcouncil.org
Cc: rcs15@psu.edu; stubuckner.scb@gmail.com

Subject: RE: Composting as a source of manganese in groundwater

Greg:

That and time. This went on for several years according to the message from Stu.

I keep in mind that it is not uncommon for groundwater in poorly drained parts of Ohio to be so high in Fe and Mn that they stain clothes and porcelain fixtures. Some black from Mn, others red-brown from Fe oxides.

Rufus

From: **Greg Evanylo** [gevanylo@vt.edu]
Sent: Friday, **October 04, 2013** 2:19 PM

To: Chaney, Rufus; cary.oshins@compostingcouncil.org
Cc: rcs15@psu.edu; stubuckner.scb@gmail.com

Subject: RE: Composting as a source of manganese in groundwater

Ah yes, time. The factor that eluded me.

BTW, shouldn't you be on leave, Rufus, rather than working?

thanks again,

greg

From: **Chaney, Rufus**
Sent: Friday, **October 04, 2013** 2:21 PM

To: 'Greg Evanylo'; cary.oshins@compostingcouncil.org
Cc: rcs15@psu.edu; stubuckner.scb@gmail.com

Subject: RE: Composting as a source of manganese in groundwater

Greg:

Yes, we are on Shutdown. But they have not deactivated my ID badge access to the back gate or my building, and I needed to download some files to work at home. So I looked at my email. Just hoping I don’t get arrested for working!!!!

What a crazy world we live in.

Rufus

From: **Basta, Nicholas** [basta.4@osu.edu]
Sent: Wednesday, **October 09, 2013** 2:46 PM

To: Chaney, Rufus; Greg Evanylo

Subject: RE: FW: Composting as a source of manganese in groundwater

Attachments: trick or treat GOP shutdown.jpg

Rufus:

Its amazing how many federal employees are working through the shutdown --like yourself. Its not the majority but it is quite a few --mostly scientists. I remember the shutdown in 1990 --I was in ARS at Morris, MN --they wouldn't let us in the lab building and we had experiments underway --but Morris was a weird place like many places in upper Minnesota.

The estimate is the shutdown will cost $10B more than just keeping the govt open --nice going Tea Party.

Hope this ends v. soon --they better not tank the global economy--again.

Nick

Nicholas Basta
Co-Director, Environmental Science Graduate Program (ESGP)
http://esgp.osu.edu/
Professor of Soil and Environmental Chemistry
School of Environment and Natural Resources
410C Kottman Hall
The Ohio State University
Columbus, OH 43210
Ph (614) 292-6282
FAX (614) 292-7432
http://senr.osu.edu

From: Chaney, Rufus [mailto:Rufus.Chaney@ARS.USDA.GOV]
Sent: Wednesday, October 09, 2013 2:11 PM

To: Greg Evanylo; cary.oshins@compostingcouncil.org; nicholas.zahn@maryland.gov; gfelton@umd.edu; smiti.nepal@maryland.gov
Cc: Basta, Nicholas

Subject: RE: FW: Composting as a source of manganese in groundwater

Greg et al.:

Yes, I understand that the Mn limit is not well justified except for miners. But it is the limit that NY is imposing on groundwater. The secondary water standard to avoid discoloring clothing, etc., may also be exceeded by these groundwaters. But composting without a solid pad caused the problem and should be corrected. NY will demand change to stop this groundwater contamination.

Best,

Still on shutdown,

Rufus

From: Greg Evanylo [mailto:gevanylo@vt.edu]

Sent: Wednesday, October 09, 2013 9:44 AM

To: cary.oshins@compostingcouncil.org; nicholas.zahn@maryland.gov; gfelton@umd.edu; smiti.nepal@maryland.gov
Cc: basta.4@osu.edu; Chaney, Rufus

Subject: Re: FW: Composting as a source of manganese in groundwater

From Nick Basta, an environmental soil chemist from Ohio State Univ and a member of our W2170 natl Multistate workgroup on chemistry and bioavailability of Land-applied waste constituents: The only significant human risk pathway for Mn in the aquifer is inhalation. The Mn standard is a secondary standard, i.e., the water isn't harmful to health, but its brown/black color makes it aesthetically undesirable.

greg

At 01:42 PM 10/8/2013, Cary Oshins wrote:
Nick et al,

Here is more info on the Manganese issue on LI, including an exchange between fellow instructor Greg Evanylo and Rufus Chaney at USDA.

Cary

From: Nicholas Zahn -MDE- < nicholas.zahn@maryland.gov>
Date: Tuesday, October 8, 2013 9:28 AM

To: Gary Felton <gfelton@umd.edu>, Cary Oshins < cary.oshins@compostingcouncil.org>
Cc: Smiti Nepal -MDE- <smiti.nepal@maryland.gov >

Subject: In the News: Manganese in Groundwater

Gary & Cary,

Thank you for all your hard work at the composting training last week; you all did an excellent job!

My supervisor forwarded me this article (also attached as PDF) about manganese in groudnwater near a composting site. I was wondering if you all had any more background info, or details about what happened here?

Hope all is well,
Nick

Nicholas Zahn, Geologist II
Investigations & Remediation Section
Solid Waste Program
Land Management Administration
410.537.3064
nicholas.zahn@maryland.gov

At 02:02 PM 10/4/2013, Chaney, Rufus wrote:

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I have not read of impacts of yard debris compost on ground water, but you have to keep in mind poor composting under highly leaching conditions. Recall that until all the OM is fully stabilized, if a compost is taken to anaerobic conditions by poorly drained condition during composting or storage, low molecular weight organic materials (organic acids, fulvic materials) formed under anaerobic conditions can become phytotoxic to sensitive seedlings and even kill seedlings (we killed pepper and Impatiens seedlings with "stored to wet biosolids compost". Much like what happens when you mix a lot of raw OM into soil until it become more stabilized. Some people stress the acetic acid formed under those conditions being toxic, other stress other organic compounds. So I support doing even yard debris composting on prepared pads with management of runoff water. One can surely find some molecules leaching, although not likely at levels which would justify concern about groundwater contamination.

If runoff and leaching are limited, I see no reason to require monitoring of yard-debris composting sites.

From: Greg Evanylo [mailto:gevanylo@vt.edu]
Sent: Wednesday, October 02, 2013 9:46 PM

To: Cary Oshins
Cc: Richard Stehouwer; Stu Buckner; Chaney, Rufus

Subject: Re: Composting as a source of manganese in groundwater

It's hard to make sense of the article. I'm skeptical of the connection between yard trimmings compost and Mn contamination of groundwater. The only facility well-described in the article ("Much of the 62-acre facility will be enclosed and a process known as an anaerobic digester will turn clippings into compost in an air-locked environment. The methane gas created will be converted into compressed natural gas to fuel equipment and the company's fleet of 10 trucks.") is anaerobic digestion, not composting.

In order to contaminate groundwater, there needs to be a source of Mn, which is not typically high in yard trimmings; however, the soil can contain much Mn. Secondly, the Mn must be solubilized in order to transport it. Under aerobic conditions prevalent in soils, Mn will be present as Mn oxide which is not soluble. Organic matter can lower redox conditions (i.e., supply electrons), solubilize Mn, and increase its mobility. The article does not provide enough information to explain how composting on a permeable surface may have resulted in a considerable increase in aquifer Mn concs.

greg

On Thu, Oct 3, 2013 at 12:26 AM, Cary Oshins < cary.oshins@compostingcouncil.org> wrote:

Have you seen this? I'd be interested in any theories on how composting could be the cause of elevated manganese.

Thanks,
Cary
USCC
----
http://www.newsday.com/long-island/water/potential-groundwater-threat-seen-from-composting-1.6147625?print=true

Greg Evanylo
Professor and Extension Specialist
Crop and Soil Environmental Sciences
185 Ag Quad Lane
426 Smyth Hall, Virginia Tech
Blacksburg, VA 24061
Ph: 540-231-9739
Fax: 540-231-3075
Cell: 540-257-4647
gevanylo@vt.edu
@VTCompost
http://www.cses.vt.edu/people/tenure/evanylo.html

From: **Cary Oshins** [cary.oshins@compostingcouncil.org]
Sent: Wednesday, **October 09, 2013** 3:14 PM

To: Greg Evanylo; Chaney, Rufus; gfelton@umd.edu; Lori Scozzafava; Brian Fleury; Brenda Platt
Cc: basta.4@osu.edu

Subject: Re: Composting as a source of manganese in groundwater

Greg and Rufus, so you know, I have been sharing our dialogue with 3 others: Lori Scozzafava (USCC ED), Brian Fleury (from We Care Organics, who operate in NY, and USCC Board member) and Brenda Platt (Chair of USCC Leg and Env. Affairs Cmte). It was Lori's email to me after seeing the newsday article that prompted my original email on this topic.

Thanks for your insights,

Cary

From: ***Greg Evanylo*** *<gevanylo@vt.edu>*
Date: *Wednesday,* ***October 9, 2013*** *11:20 AM*

To: *Rufus Chaney <Rufus.Chaney@ARS.USDA.GOV>, Cary Oshins <cary.oshins@compostingcouncil.org>, <nicholas.zahn@maryland.gov>, Gary Felton <gfelton@umd.edu>, <smiti.nepal@maryland.gov>*
Cc: *<basta.4@osu.edu>*

Subject: RE: FW: Composting as a source of manganese in groundwater

Rufus,

I didn't forward the previous email, nor do I believe Nick shared the information, to minimize the results of poor site management. My email was sent
as additional information on Mn issues and water pollution. If the Mn solubilization and transport tells us anything, it's that a heck of a lot of soluble
organic matter/BOD moved through the permeable soil.

Still working,
greg

At 02:11 PM ***10/9/2013****,* ***Chaney, Rufus*** *wrote:*

Greg et al.:

Yes, I understand that the Mn limit is not well justified except for miners. But it is the limit that NY is imposing on groundwater. The secondary water standard to avoid discoloring clothing, etc., may also be exceeded by these groundwaters. But composting without a solid pad caused the problem and should be corrected. NY will demand change to stop this groundwater contamination.

Best,

Still on shutdown,

Rufus

From: **Greg Evanylo** [gevanylo@vt.edu]
Sent: Wednesday, **October 09, 2013** 4:06 PM

To: cary.oshins@compostingcouncil.org; Chaney, Rufus; gfelton@umd.edu; lscozzafava@compostingcouncil.org;

BfleuryWeCare@aol.com; brendaaplatt@gmail.com
Cc: basta.4@osu.edu

Subject: Re: Composting as a source of manganese in groundwater

That's why I've been copying you. While I have few answers, I've been happy to facilitate the info exchange.

greg

*At 03:14 PM **10/9/2013**, **Cary Oshins** wrote:*

Greg and Rufus, so you know, I have been sharing our dialogue with 3 others: Lori Scozzafava (USCC ED), Brian Fleury (from We Care Organics, who operate in NY, and USCC Board member) and Brenda Platt (Chair of USCC Leg and Env. Affairs Cmte). It was Lori's email to me after seeing the newsday article that prompted my original email on this topic.

Thanks for your insights,

Cary

From: **Sally L. Brown** [slb@u.washington.edu]
Sent: Tuesday, **October 15, 2013** 12:41 AM

To: Chaney, Rufus

Subject: Re: Manganese Issue near Long Island . . . (fwd)

Rufus

I don't get this. The foliar or feedstock Mn concentrations should be < 50 ppm. If it is an aerobic composting site, that Mn should be insoluble. Do you think it is the composting sites?

Hope you are holding up with the furlough

---------- Forwarded message ----------
Date: Mon, **14 Oct 2013** 21:26:45 -0700
From: **MattCotton Inmotion IMAP** <matt@mattcotton.com>

To: Lori Scozzafava <lscozzafava@compostingcouncil.org>
Cc: "<alexassoc@earthlink.net>" <alexassoc@earthlink.net>, Brian Fleury <bfleurywecare@aol.com>, carrie gregory <cgregory@fairpoint.net>, Chuck Wilson <ChuckWilson@A1Organics.com>, Eliot Epstein <epsteinee@comcast.net>, "FRFR (Frank Franciosi)" <FrFr@novozymes.com>, Heidi Ringhofer <heidi.ringhofer@wlssd.com>, Jeff Ziegenbein <jziegenbein@ieua.org>, Lorrie Loder <lloder@synagro.com>, "<lorrieloder116@gmail.com>" <lorrieloder116@gmail.com>, Mike Manna <manna@orsllc.org>, Patrick Geraty <pgeraty@stlcompost.com>, Paul Sellew <psellew@harvestpower.com>, Rodney Tyler <rodt@filtrexx.com>, "<slb@u.washington.edu>" <slb@u.washington.edu>, "<waynesr@erthproducts.com>" <waynesr@erthproducts.com>

Subject: Re: Manganese Issue near Long Island . . .

Lori -

FYI

Matthew Cotton
Integrated Waste Management Consulting, LLC
19375 Lake City Road
Nevada City, CA 95959
530-265-4560 Office
530-305-2060 Mobile
matt@mattcotton.com

Stony Brook to conduct research for state

By NUJBAT MERAJI | October 14, 2013

Groundwater on Long Island is continually tainted by high levels of manganese from large-scale composting projects, according to the New York State Department of Environmental Conservation.

The department contacted Stony Brook University about potentially researching how the composting of trees, leaves and grass clippings has impacted groundwater. The Waste Reduction and Management Institute at the School of Marine and Atmospheric Sciences would be responsible for the project, DEC spokeswoman Lori Severino said.

Henry Bokuniewicz, a distinguished service professor at the School of Marine and Atmospheric Sciences,

is currently doing the analysis on all the existing data related to this situation.

When composting, there is always a concern that chemicals like pesticides will seep into the groundwater, he said. And as more composting occurs, water absorbed into the ground has less oxygen, causing chemical reactions in the ground that also cause naturally occurring manganese to seep into groundwater.

“It is a research into the chemical effects of composting on groundwater quality,” Bokuniewicz said. “We have been in touch with the DEC and the Suffolk county Health Department.”

Currently, Bokuniewicz and the graduate student in charge of the research are looking for chemicals that are unique to composting sites and the chemical reactions involved. They are also planning to visit these sites to develop a plan for sampling. Once they come up with a hypothesis, it will be presented to the DEC for approval.

Elevated manganese levels were discovered in 2009 during state and county investigations near Long Island Compost in Yaphank, according to Newsday. Other composting facilities have shown similar issues, according to Suffolk’s Department of Health Services. Severino said that the state would revise the permits issued to compost facilities.

Even though manganese is a key component of a healthy diet, high levels can cause health issues, including neurological problems.

Bokuniewicz said he hopes analysis of the data will be completed by the end of the year.

Sent from my iPad

On Oct 1, 2013, at 1:54 PM, "Lori Scozzafava" <lscozzafava@compostingcouncil.org> wrote:

I don’t enjoy sending negative news clips, but we all need to know when the press is nipping at our heels.

If any of you have knowledge about what is happening here and can give me some info in case the press calls, I'd appreciate it.

http://www.newsday.com/long-island/water/potential-groundwater-threat-seen-from-composting-1.6147625?print=true

Lori
Lori Scozzafava
Executive Director
US Composting Council / Composting Council Research & Education Foundation
5400 Grosvenor Lane, Bethesda, MD 20814
Main (301)897-2715 x 305
Direct (301)897-2511

From: **Chaney, Rufus**
Sent: Tuesday, **October 15, 2013** 2:02 PM

To: 'Sally L. Brown'

Subject: RE: Manganese Issue near Long Island . . . (fwd)

Attachments:
Long Island Compost-2013-Horseblock Road Investigation Report - July 2013.pdf;
Long Island Compost-7-2013-Newsday Article.pdf

Sally:

When you push a lot of BOD into the surface soil, and keep it very wet, it is anaerobic. Mn2+ gets

dissolved and with time can leach in wet environment like Long Island. The concentrations measured were very high, but I believe attainable with this poor practice of composting without a pad. They had too much for their permitted site, so took feedstocks to farmers' fields without pad. High Fe along with Mn (but less than Mn for redox reasons) but few other metals increased. Redox.

Rufus

From: **Chaney, Rufus**
Sent: Tuesday, **October 15, 2013** 3:43 PM

To: 'Compost Discussion List'

Subject: Mn and Fe in Long Island groundwater from improper composting of yard debris

Dear Colleagues:

There has been a lot of discussion of this case of groundwater contamination with Mn and Fe in NY, but I haven't seen anything at the USCC discussion list. So I'll give the explanation I have provided to those who wrote me earlier. Stu Buckner contacted me to ask about the case. NY State and Country environmental officials measured excessive Mn and Fe in ground water which was clearly technically related to composting sites for yard debris. Nothing exotic. I was sent the data by Stu Buckner and responded with this explanation:

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*From: stu [**stubuckner**@optonline.net]*
*Sent: Monday, **February 06, 2012** 2:51 PM*

To: Chaney, Rufus

Subject: Mn in yw compost

Hi Rufus,

Hope all is well with you.

What are typical levels of Manganese in yard trimmings compost?

What are high levels of Mn in yard trimmings compost and what problem might that pose, if any.

The research I have read and the data I've collected show no impact of yard trimmings compost on groundwater. Do you know of any research that shows otherwise?

Is there any reason to require monitoring of groundwater at yard waste composting

Thanks,
Stu

Which email address should I use?

Dr. Stuart Buckner
Buckner Environmental Associates (BEA)
8 Cardinal Lane
East Islip, NY 11730
631.834.1400
stubuckner@optonline.net
Consultants in:
Composting, Organics Recycling, Anaerobic Digestion, Bioplastics, Organics Management and Integrated Solid Waste Management Solutions
Conference & Exhibition Planning and Management
Not-for-Profit Association Governance and Management
Fundraising – Campaigns for Sponsors, Donors, Members

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*From: **Chaney, Rufus***
*Sent: Monday, **February 06, 2012** 3:09 PM*

To: 'stu'

Subject: RE: Mn in yw compost

Stu:

One needs to understand how Mn is deficient or toxic in order to understand how much is enough or too much in compost. At pH 5.4 and above, microbes oxidize nearly all Mn to MnO2, an insoluble form which is available to roots, but not water soluble. At lower pH, especially if the soil is air dried (chemical reduction occurs between OM and MnO2 to generate Mn2+), and if the total Mn is high, the compost or soil can become Mn phytotoxic. In the past, bark composts from AR contained phytotoxic Mn because of the pH and because the bark of some trees can be very high in Mn when the soil is high in Mn and the soil pH is low. Hardwood bark was the culprit in the AR case. There are papers in the horticultural literature from when people were trying to sell bark as a soilless medium for potting media. Wood is generally not likely to cause Mn phytotoxicity under any case I have read about.

Most composts are pH 6.5-7, and Mn is in non-toxic forms at all Mn concentrations. But still in plant available forms that roots can absorb by reducing MnO2 or absorbing Mn2+ bound to OM and clays.

Yard debris is usually 35-200 ppm total Mn. It could reach 1000 ppm without much concern unless the compost is very strongly acidic.

I have not read of impacts of yard debris compost on ground water, but you have to keep in mind poor composting under highly leaching conditions. Recall that until all the OM is fully stabilized, if a compost is taken to anaerobic conditions by poorly drained condition during composting or storage, low molecular weight organic materials (organic acids, fulvic materials) formed under anaerobic conditions can become phytotoxic to sensitive seedlings and even kill seedlings (we killed pepper and Impatiens seedlings with "stored to wet biosolids compost". Much like what happens when you mix a lot of raw OM into soil until it become more stabilized. Some people stress the acetic acid formed under those conditions being toxic, other stress other organic compounds. So I support doing even yard debris composting on prepared pads with management of runoff water. One can surely find some molecules leaching, although not likely at levels which would justify concern about groundwater contamination.

If runoff and leaching are limited, I see no reason to require monitoring of yard-debris composting sites.

When excessive BOD is mixed into soil and kept anaerobic, Mn2+ and Fe2+ are formed. With uncontrolled leaching conditions (lack of pad which prevents leaching), these soluble Mn and Fe will move into the ground water especially in acidic subsoils which keep the anaerobic slug of Mn and Fe from becoming oxidized. These sites did not have compost pads. If proper pads are installed, there will be no reason for concern about Mn or Fe in composting sites or products.

I did not attach the NY monitoring reports but they are available upon request.

Regards,

Rufus Chaney
USDA-ARS
Beltsville, MD